

CLAIMS

- 1 1. An underfill composition comprising:
2 a resin; and
3 a curing agent selected from the group consisting of anhydride polymers,
4 anhydride oligomers, anhydride copolymers and mixtures thereof.

- 1 2. The composition according to claim 1 wherein the curing agent is an olefin/maleic
2 anhydride.

- 1 3. The composition according to claim 2 wherein the olefin/maleic anhydride is
2 selected from the group consisting of styrene/maleic anhydride,
3 cyclohexane/maleic anhydride, and norbornene/maleic anhydride.

- 1 4. The composition according to claim 1 further comprising at least one catalyst,
2 elastomer, coupling agent, filler, fluxing agent, flow agent, adhesion agent, and
3 mixtures thereof.

- 1 5. The composition according to claim 4 wherein the catalyst is selected from the
2 group consisting of imidazoles, phosphines, dicyanamide, and substituted
3 dicyanamide compounds.

- 1 6. The composition according to claim 4 wherein the curing agent is in an amount of
2 from about 5 to about 25 weight percent based on total weight of the resin and the
3 catalyst.

- 1 7. An underfill material that is a cured epoxy resin composition comprising:
2 one of a liquid and semisolid epoxy resin; and
3 a curing agent selected from the group consisting of anhydride polymers,
4 anhydride oligomers, anhydride copolymers, and mixtures thereof.
- 1 8. The composition according to claim 7 wherein the curing agent is an olefin/maleic
2 anhydride.
- 1 9. The composition according to claim 8 wherein the olefin/maleic anhydride is
2 selected from the group consisting of styrene/maleic anhydride,
3 cyclohexane/maleic anhydride, and norbornene/maleic anhydride.
- 1 10. The composition according to claim 7 further comprising at least one catalyst,
2 elastomer, coupling agent, filler, fluxing agent, flow agent, adhesion agent, and
3 mixtures thereof.
- 1 11. The composition according to claim 10 wherein the catalyst is selected from the
2 group consisting of imidazoles, phosphines, dicyanamide, and substituted
3 dicyamide compounds.
- 1 12. The composition according to claim 10 wherein the curing agent is in an amount
2 of from about 5 to about 25 weight percent based on total weight of the resin and
3 the catalyst.

1 13. A device comprising:

2 a substrate;

3 an electrical component; and

4 an underfill composition between the electrical component and the substrate,

5 the underfill composition including

6 a resin; and

7 a curing agent selected from the group consisting of anhydride

8 polymers, anhydride oligomer, anhydride copolymers and mixtures

9 thereof.

1 14. The device according to claim 13 wherein the curing agent is an olefin/maleic

2 anhydride.

1 15. The device according to claim 14 wherein the olefin/maleic anhydride is selected

2 from the group consisting of styrene/maleic anhydride, cyclohexane/maleic

3 anhydride, and norbornene/maleic anhydride.

1 16. The device according to claim 13 further comprising at least one catalyst,

2 elastomer, coupling agent, filler, fluxing agent, flow agent, adhesion agent, and

3 mixtures thereof.

1 17. The device according to claim 16 wherein the catalyst is selected from the group

2 consisting of imidazoles, phosphines, dicyanamide, and substituted dicyamide

3 compounds.

1 18. The device according to claim 16 wherein the curing agent is in an amount of
2 from about 5 to about 25 weight percent based on total weight of the resin and the
3 catalyst.

1 19. A method of fabricating a device, comprising:
2 fabricating an integrated circuit chip, the integrated circuit chip including
3 a plurality of electrical bond pads;
4 fabricating a substrate;
5 positioning the integrated circuit chip relative to the substrate;
6 providing electrical connection between the integrated circuit chip and the
7 substrate during a reflow operation;
8 providing an underfill composition between the integrated circuit chip and the
9 substrate, the underfill composition including
10 a resin; and
11 a curing agent selected from the group consisting of anhydride
12 polymers, anhydride oligomers, anhydride copolymers, and a mixture
13 thereof.

1 20. The method according to claim 19 wherein the underfill composition is provided
2 simultaneously during reflow.

1 21. The method according to claim 19 wherein the underfill composition is provided
2 after reflow.

1 22. The method according to claim 19 wherein the underfill composition is cured.

1 23. The method according to claim 22 wherein the curing occurs within a temperature
2 range of from about 130° C to about 170° C.

1 24. A method according to claim 22 wherein the curing occurs within about 5 minutes
2 to about 4 hours.